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Forgotten edible heritage: the case study of the UNESCO Site of Akbarieh Garden in Iran

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Abstract

Persian gardens have been an essential component of Iranian urban and architectural history for almost 2500 years. Persian gardens continued to provide provisioning services (i.e. food production) until the twentieth century when their status and role switched from productive to ornamental gardens. In this study, we conducted interviews and field surveys in a Persian garden in eastern Iran to understand how the use of edible plants has changed since the end of the 1970s. Although the production function is not the primary role of this garden, the results demon-strate that numerous edible species have been reintroduced. In addition, the marketing and branding of the fruits cultivated in the garden could be a source of income for the garden's maintenance. From an ethnobotanical and germplasm conservation point of view, this garden features key cultivars and plants that have been used in traditional Iranian medicine.

Keywords

Edible heritage; edible landscape; Persian garden; Iran; germplasm conservation; ethnobotany

Introduction

Botanical and historic gardens are germplasm repositories that, with appropriate planning and implementation, can provide an almost infinite supply of material for current and future use (Dosmann, 2006). Historic gardens could be thought of as "oases of historical fruit trees" or even historical fruit orchards (Botti & Biasi, 2010). They are resilient places for the conservation of fruit tree germplasm and traditional cultivation systems, becoming, as a result, sites where botanical, ecological, cultural, historical, and aesthetic values can meet, due to their confined structure and frequently preserved status, in comparison to rural areas (Botti & Biasi, 2010). Academic interest in historic gardens peaked in the 1980s, around the time the Florence Charter declared historic gardens to be living monuments (Funsten, Borsellino, & Schimmenti, 2020; ICOMOS, 2011). The initial decades of research were primarily devoted to establishing the broad advantages and principles of historic garden conservation (Funsten, Borsellino, & Schimmenti, 2020). In most cases, the productive aspects of historic gardens are not given the same attention as other elements (Botti & Biasi, 2010). In today's urban context and public property, historic gardens are frequently recognised for their social and environmental role, rather than their cultural and landscape merits (Cazzani, Zerbi, Brumana, & Lobovikov-Katz, 2020). Furthermore, ethnobotanical studies (i.e. humans, plants, interactions, and use) (Rahman et al., 2019) on historic gardens are uncommon, and most historic garden research is conducted in Europe (Funsten et al., 2020), even though the Middle East possesses hundreds of historic gardens on the UNESCO World Heritage List.

In particular, historic Persian gardens are the first examples of Iranian green spaces that have established a complex relationship with the cities and become part of public spaces from the eleventh century onwards and are still being used actively by urban dwellers (Khosravi, 2014). Persian gardens as Iranian urban green spaces are still actively used by urban residents and their importance for the inhabitants' health, status, and wellbeing has been addressed. It has been proved that the historical Persian gardens are successful public places (Rostami, Lamit, Khoshnava, & Rostami, 2016) that play an integral part in the residents' identity and health (Rostami, Lamit, Khoshnava, & Rostami, 2014). The gardens do not just represent physical spaces; rather, they represent the interconnected physical, symbolic, spiritual, and social aspects of citizens' culture. Gardens can fulfil the psychological needs of contemporary urban residents (Ramyar, 2020).

Despite the prototype concept of the Persian garden as multifunctional landscapes in which both utilitarian and pleasure gardening were integrated, the current Iranian perspective towards the Persian garden has predominantly focused on the gardens as places for recreation and relaxation (Amani-Beni et al., 2021a; Amani-Beni et al., 2021b; Khalilnezhad, 2016). Pleasure in the form of food and consumption of the edible produce has played a key role in social interaction in the Persian garden for the past 2,500 years (Floor et al., 2019). However, during the last 100 years, the concept of these gardens has evolved, shaped by changes in Iranian society and Persian culture as a whole. In 2000, a project called "Regulating the Intervention in the Historical Gardens, Sites and Enclosure" was initiated by Iran's former Cultural Heritage Organization, which resulted in the formation of the "Garden Department" and the "Technical & Strategic Committee for Persian Garden". Thus, for the first time, a new approach in the former Cultural Heritage Organization was adopted, which, in addition to the gardens' buildings, also paid attention to its vegetation. In 2004, the 1st International Conference on Persian Gardens was held in Tehran, which emphasised

citizens' participation in the management of gardens, promoting economic productivity and increasing the amount of food production in the gardens.

Presently, after the severe land uses changes in Iranian cities, some of those mentioned historic gardens have been protected, registered under Iran's National Cultural Heritage, and fortunately, nine gardens representing the Persian Gardens concept were listed as UNESCO World Heritage Sites in 2011 (https://whc.unesco.org/en/list/1372/). The study by Khalilnezhad (2019) on the seven Persian gardens, which have all been registered by UNESCO as World Heritage Sites (Abbas-Abad, Fin, Akbarieh, Dolat-Abad, Pahlavanpour, Chehelsotun, and Shazadeh) shows there is insufficient attention towards the conservation and restoration of productive vegetation in the Persian gardens. In the Fin and Chehelsotun gardens, the agricultural landscape has been completely devastated and converted to non-original decorative green spaces.[1] In the same way, visitors to the Abbas Abad garden do not see any productive areas within the garden. On the other hand, the fruit-bearing trees and bushes in the Akbarieh, Shahzadeh, and Pahlavanpour gardens have been preserved. Fortunately, the agricultural lands of the Dolat Abad garden have not yet been converted, but neither are they active and flourishing.

Nowadays, these gardens illustrate the pathological perspective of the struggle with some issues such as the elimination of the edible landscape, not involving the citizens in planning and maintenance, neither engaging the citizens in the agricultural activities nor place-making to accommodate the revival of agriculture (Amani-Beni et al., 2021; Khalilnezhad, 2016). Conservative approaches through rules and regulations, with the aim of defining and protecting the urban historic gardens as permanent and long-term land uses, do not guarantee farming activity. Despite the permanency of the layout of historic gardens in the city structure, their productivity and profitability in some cases are temporal, with a sharply fluctuating maintenance profile (Lohrberg et al., 2016). This shows, there is no systematic approach to planting fruit-bearing plants in Iran's public gardens as a strategy for the conservation of rare and ancient varieties. The reintroduction of edible species into these gardens may have both cultural and educational benefits, as well as economic benefits.

In this article, we used a case study of a Persian garden in eastern Iran to understand how the use of edible plant species has changed over the last forty years and what ethnobotanical resources this garden possesses.

Methodology

This study uses the case study method for landscape architecture developed by Francis (2001) (Francis, 2001). In particular, we conducted interviews as well as field surveys using ethnobotanical and arboricultural methods (Jones & Hoversten, 2004).

The study garden is the Akbarieh Garden located in eastern Iran (Figure 1), which was inscribed on the UNESCO World Heritage List in 2011. The reason for choosing this garden is the existence of people and experts who have known the condition of the garden well over the last 40 years, and through open interviews with these people, researchers could understand the process of managing and maintaining the edible landscape of the garden.

Figure 1. Study location (Source: Google map).

Interviewees include the director of Akbarieh Garden, the supervisor of the green space, and the gardener's senior gardener, all of whom have been working in the garden for more than two decades. The interviews took place in autumn 2021. In addition, several field studies to monitor the edible landscape of the garden between 2013 and 2021 were conducted by the first author who documented this by photographing garden scenes. Today, Akbarieh Garden is one of the tourist gardens located in Birjand city (the capital of South Khorasan province in eastern Iran and bordering Afghanistan), which annually receives thousands of domestic and foreign tourists (Khalilnezhad et al.,

2021). This garden is about 200 years old and its current use is as a museum and tourist space. But in the past (from Qajar to the second Pahlavi; the nineteenth and twentieth centuries up to 1978) it was the residence of local rulers. In addition to its architectural heritage, Akbarieh has a historical agricultural landscape that is still protected and maintained, and its products are consumed annually by the staff of the Birjand Cultural Heritage Office. The owner of this garden, according to the will of the last owner, Asadullah Alam; is Astan Quds Razavi; but its specialised management and maintenance have been under the supervision of the Iranian Ministry of Cultural Heritage, Handicrafts and Tourism since 1992.

Results and discussion

The effect of different periods of garden management on the food landscape of Akbarieh Garden was studied to clarify the situation surrounding the garden's food landscape. The lack of data recorded in Akbarieh Garden and limited resources meant that recording some images was the only way to identify how the garden food landscape was managed supplemented by interviews with the garden director and supervisor of green space and the garden's senior gardener. The results of these interviews show that the Akbarieh Garden management strategies can be divided into five periods.

First period (1978 to 1981): the period of abandonment

There is not a large amount of information available from this period. It is the period when the Islamic Revolution won in Iran and Akbarieh Garden started the period of liberation. Before that, the garden belonged to Assadollah Alam, the prime minister of Iran during the Pahlavi era but before his death, he did dedicate the garden to Astan Quds Razavi. As a result, the garden was not yet registered in the list of national monuments and therefore it was not considered a historical space. However during this period, the gardeners were active and watered and maintained the garden but because of a lack of specialised and expert supervision, the garden became overgrown and looked like a forest. The Akbarieh Garden's fruit trees were not professionally maintained and pruned. Figure 2 shows Akbarieh garden before the Islamic Revolution in 1979.

Second period (1981 to 1992): police station in the garden

During this phase, Akbarieh Garden was handed over to the Iranian police for eleven years. The historical value of the garden was not yet understood and it had not yet been nationally registered. The police used the garden as an administrative and disciplinary base and made extensive changes to it. Garden trees (around the stables and docks) were not taken care of, for example, pine trees were not irrigated with the result that these ornamental trees dried out and were cut down.

The edible landscape of the garden was located in the northern part of the garden, and the police force were able to use the buildings in the southern part of the garden without entering the agricultural sector. Soldiers and visitors were not permitted to enter this section of the garden. Only gardeners were allowed to enter the food landscape after metal doors and fences were installed in front of the southern portion of the garden. Fruit trees were infested with pests and suffered damage due to a lack of maintenance.

Lack of pruning caused the ageing of apricot, plum and plum "Reine-Claude Verte". The planting system of the garden did not change. For example, alfalfa, vegetables and summer crops were preserved and planted on the northern plots on the north side. In addition to the loss of several fruit trees, this method of maintenance led to the loss of ornamental trees (pines) located next to the garden fence, which is now vacant. The same thing happened with the trees on the main garden path. Many dried up, there was no specialised supervision of the garden, and gardeners watered only fruit trees and edible plants. At this time, because the fields around the garden were still cultivated (wheat, alfalfa, and barley), some of the garden water was transferred there. This damaged the garden and the trees at the end of the garden withered. The police planted common privet (*Ligustrum ovalifolium*) between the northern and southern parts of the garden to create a green wall to cover the garden's dryness and the agricultural sector's defects.

Third period (1992 to 2000): registration of the garden in the list of national monuments and establishment of a Cultural Heritage Agency

Throughout this time, a Cultural Heritage Office representative office was established in the garden after the garden was registered as part of Iran's National Heritage. The edible landscape of the garden is still maintained by the old gardeners during this period, as it was before.

The police had installed closed doors and paths to the southern garden, which were maintained until 1996. From 1996, under the supervision of the architectural engineers and restoration experts, a new phase began in the garden.

Figure 2. Historic photographs of Akbarieh Garden before the Islamic Revolution in 1979.
a: garden greenhouse; b and c: main axis of the garden comprising pine trees, d: position of greenhouse at the end of the garden, e: edible landscape as avenue for children's play; f: the main pavilion of the garden in contact with the green space

Yaghoub Daneshdoost is an architect, restorer of historical buildings and sites, a researcher and writer, and an expert on Iranian gardens who has restored many Iranian gardens. He worked on the scientific restoration of the garden. Daneshdoost restored the garden by focusing on the architectural spaces, pathways and yards, without interfering with the food production landscape. He redesigned the garden taking in the geometry of the garden space, shaping the geometry of the streets and the space in front of the mansion. He raised the floor of the garden using construction debris which caused the stream levels to drop. Debris rubbish (stone, cement, and lime) and the transfer of these materials around the trees weakened their roots. Daneshdoost also designed the yard in front of the mansion and gave it a geometric shape but the work damaged and destroyed the trees and as a result the 6 pines were moved out of the garden. He also added 4 around the central pond. The Daneshdoost restoration measures were limited to the architectural spaces and the decorative landscape of the garden. However, two southern plots were planted with apricot trees, but these dried up due to lack of water. In this period, we see the beginning of garden decoration which

where pines were moved out of the garden. He also began the planting of grass at the entrance to the garden.

Fourth period (2000 to 2011): the revival of a food landscape with a modern horticultural approach

Mr Mehran Safaei has been managing the garden green space as a green space consultant since October 2000, with the task of revitalising the garden. Due to the age of the fruit trees and their associated pests, he had to fell them. In addition, because of the deterioration in water quality, high water EC, and low water flow, it was thought that some of the garden's older trees and other species would not survive. Pistachios, figs, pomegranates, berries, and blackberries were the only plants that were preserved. In some situations this changed the species' variety that was used, for example, Shahroudi apricot is used instead of Qaisi apricot. In addition, he planted additional trees. In 2003, the lowest part of the garden (following the central pond) was planted with pears, plums "Reine-Claude Verte", apricots, and pomegranates. He modified the garden's composition of fruiting species based on the technical justification described above. Some of the trees he included in the garden system were green tomatoes, apples, pears, plums, and a few jujube trees.

Therefore, while no one visited the garden from 1978 to 1996 and all the attention was concentrated on restoring the building and the hard landscape, Engineer Safaei worked on restoring the soft landscape. Severe pruning of pistachio trees, replanting of pine trees at the end of the main path, and planting alternative trees for the main path's primary trees are among his other actions. He not only planted new fruiting species in the garden, but he also added new attractive species.

Fifth period (2011 to 2021): registration in the World Heritage list

In order to be registered on UNESCO's World Heritage list, plants were catalogued and labelled, and the preservation and protection of existing species were high on the priority list. Lawns, ivy, and privet were removed during this time, as were other heterogeneous and non-original plant elements. Trees that had been cut down in previous decades were gradually replanted, such as the pine trees in stables and docks. The garden's southern courtyard, known as the inner courtyard, had remained relatively unchanged over the years and was close to its original state. There are three plots in this area: pomegranates in the central and western plots, and pistachios in the eastern plots. Pomegranates have also recently been replanted in this yard's central area. The fifth decade of garden management is where the Akbarieh Garden is returning to its origins. Therefore, in this decade, based on documents such as aerial photographs, old garden images, gardeners' information and personal information, the garden flower beds were revived, the east-west privet hedge was removed, and some of the garden's ornamental plants, such as pines, were replanted.

In addition to the soft landscape, the hard landscape was also modified. In this regard, the surface of the pathways was improved (in relation to the 1990s and the Daneshdoost plan designs) because the materials used in the 1990s were heterogeneous (stone, mortar and lime concrete to a depth of 40 cm) and were harmful and caused tree disease and drought resulting in the removal of 2 old pines. The roots of the trees were buried around the floors. In the new plan, as the floor of the pathways were constructed, the roots of the pine trees were released and able to absorb more water so reviving them and releasing them from the drought.

Another measure was the restoration of the garden's agricultural landscape. Primarily, fruit trees (most importantly apricots and pistachios) were preserved according to World Heritage records (Figure 3). However, the intensity of climate change pressures and water shortages led to the garden green space consultant (Engineer Safaei) changing some species of fruit trees. For example, he planted Reine Claude Verte and plums instead of apricots. In order to preserve the main fruit trees from the pests and diseases which were being harboured in the vegetable garden and summer crops, these plots were removed and jujube and barberry trees were planted instead (Figure 4).

During this period, modern attitudes of horticulture overcame traditional attitudes. The old gardeners had died, and nobody had a traditional knowledge of gardening in the Birjand Cultural Heritage Office. Therefore, in reviving the edible landscape of the garden, a modern outlook prevailed again. The previously removed pomegranates were revived in the central path and for two periods heavy pruning was imposed on pistachio trees. Pistachios were also replaced. Today, the most original fruit varieties of the garden are Akbari pistachio, Qaisi and Shahroudi apricots and garden berries.

Figs were also propagated from the same garden cultivar around the marginal path of the garden. Between 2011 and 2021, saffron was planted in the garden's northern section (northeast plot). This activity was done with the goal of conducting a saffron research study for tourism purposes so that visitors can see the region's strategic plant in the garden. The idea was to replace saffron with vegetable plots and, on a vegetable scale, to rejuvenate the edible landscape with a new plant (saffron). However, this initiative failed and barberry and jujube trees were introduced.

Figure 3. Mature pistachio trees in the edible landscape of Akbarieh garden.

Figure 4. New-planted barberry and jujube trees instead of devastated vegetable plots in the north segment of the garden.

During this time, two new perspectives on the edible food landscape emerged: a tourism perspective and an environmental one, as well as the return of birds to the garden. This garden is not currently considered as edible heritage by the Ministry of Cultural Heritage, Tourism, and Handicrafts (MCHTH). Gardeners were previously reliant on garden products, but now that they are paid by the government, both the MCHTH and the gardeners' perspectives on the garden have changed. Even the quantity of production is not measured. However, the plan for the future of the Akbarieh Garden devised by the Head of Garden Administration indicates that the Persian garden's edible history may be restored in a new economic form.

"We consider that for Akbarieh Garden, one of the ways to compensate for our expenses is to offer seasonal fruits and flowers," he remarked in response to the question "Do you have a strategy for the future of fruit trees growing in the garden?" According to the historical sources we examined, this garden once had a Qajar-era greenhouse, which was destroyed during the invasion and possession of the garden, and a new greenhouse with a gable roof has since been built. We want to restore that greenhouse based on historical documentation, and the Strategic Council has permitted us to do so. Seasonal plants are moved to this greenhouse for sowing, making cuttings, and propagation before being planted for sale. People would be able to buy fruits directly from the site. The MCHTH has completed the majority of the work, and the permit is expected to be issued within a year or two. [After the implementation of the aforementioned plan], access circumstances for visitors will be improved, and products sold under the Akbarieh brand will be more fairly priced and of higher quality."

Current edible landscape – survey results

We found a total of 1,281 edible plants as well as 770 m^2 of kitchen herbs/spices. The most frequent fruit tree is *Punica granatum* (Figure 5). Pomegranate (including the blossoms, leaves, bark of young shoots and roots, fruit peel, and pomegranate sauce) has long been used in traditional medicine (Shaygannia, Bahmani, Zamanzad, & Rafieian- Kopaei, 2016). In addition, some of the species listed in Table 1 have been used for centuries as medicinal plants (Buso et al., 2020).

However, the edible woody plants in the garden accounted for only 22% of the total woody plants (Figure 6). The edible plants found within the garden that are important ethnobotanical resources, are the same as described in the Birjand flora (Mood, 2008). This last aspect helps us understand the educational function of this historic garden. In addition to their cultural value, these plants provide several ecosystem services (Russo & Cirella, 2020; Russo, Escobedo, Cirella, & Zerbe, 2017).

Figure 5. Mature pomegranate tree in Akbarieh World Heritage Garden

Table 1. Edible plants and ethnobotanical aspects.

Edible Landscape				
Species	Age Class	Numbers	Plant use related to medicine, ceremony, and rituals (adapted from Jones & Hoversten, 2004)	Plant Part Used
Prunus armeniaca	Young	20	Traditional Iranian medicine Food and drinks	Fruit
Prunus armeniaca	Sapling	42		
Pistacia vera	Mature	85	Traditional Iranian medicine Food and drinks	Fruit
Pistacia vera	Young	76		
Morus alba	Mature	31	Iranian traditional medicine Food and drinks	Fruit
Morus alba	Young	8		
Morus alba	Sapling	162		
Punica granatum	Mature	447	Iranian traditional medicine (Buso et al., 2020) Food and drinks	Fruit
Punica granatum	Young	42		
Ziziphus jujube	Young	22	Iranian traditional medicine (Buso et al., 2020) Food and drinks	Fruit
Ziziphus jujube	Sapling	25		
Berberis vulgaris	Young	49	Iranian traditional medicine (Rahimi-Madiseh, Lorigoini, Zamani-Gharaghoshi, & Rafieian-Kopaei, 2017) Food and drinks	Fruit
Prunus domestica	Young	4	Food and drinks	Fruit
Prunus domestica	Sapling	43		
Piper nigrum	Young	38	Iranian traditional medicine (Rashedinia et al., 2021) Food and drinks	Fruit
Ficus carica	Mature	3	Iranian traditional medicine (Buso et al., 2020) Food and drinks	Fruit
Ficus carica	Young	27		
Ficus carica	Sapling	150		
Cydonia oblonga	Young	2	Iranian traditional medicine (Buso et al., 2020) Food and drinks	Fruit
Crataegus persica	Young	5	Food and drinks	Fruit
Crocus sativus	Young	320 m^2	Iranian traditional medicine (Javadi, Sahebkar, & Emami, 2013) Food and drinks	Flower
Rosmarinus officinalis	*Young*	*210 m^2*	Iranian traditional medicine (Buso et al., 2020) Food and drinks	Leaves
Salvia officinalis	*Young*	*200 m^2*	Iranian traditional medicine (Hamidpour, Hamidpour, Hamidpour, & Shahlari, 2014) Food and drinks	Leaves
Capsicum annuum "NuMex Memorial Day"	*Young*	*40 m^2*	Iranian traditional medicine (Buso et al., 2020) Food and drinks	Fruit

Conclusions

Iranian gardens are in many cases publicly accessible open spaces, allowing users to interact with each other so subsequently enhancing social inclusion. However, many species that have been used for food and medicine for generations are dying or disappearing from these gardens due to inadequate maintenance and climate change. The potential for reintroducing edible plants and creating opportunities with historic Persian gardens have been forgotten.

This paper's primary idea was in charting the decline of the historic Persian garden's edible importance in modern times. Changes in the socio-cultural system and the lack of dependence on the products of urban gardens, showed the view of these gardens as no longer having a productive and food/ edible aspect. However, in the most recent period, with the introduction of ideas such as urban agriculture, urban gardening and a food landscape, the authors have also tried to critique and interpret the food heritage of the Iranian garden. This case study, of the Akbarieh Garden, showed that despite being inscribed in the National Heritage of Iran and a UNESCO World Heritage Site, it still has an edible landscape. Field surveys in the Akbarieh Garden also showed that more attention on maintenance and management has been focused on the restoration of architecture and buildings and the hard landscape of the garden. However, about twenty-one years ago,

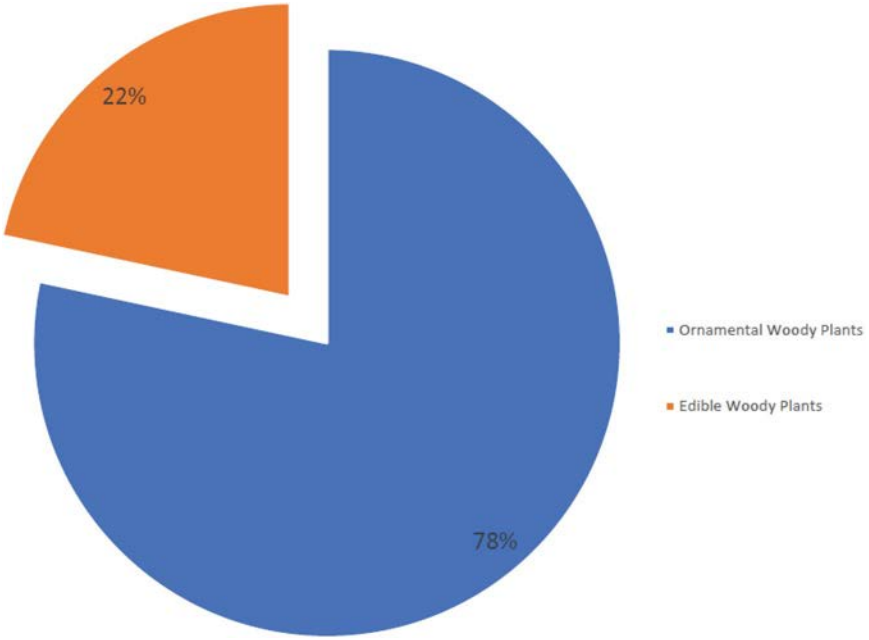

Figure 6. Percentage of edible woody plants in current Akbarieh Garden.

looking at the restoration of the garden green space was on the agenda of cultural heritage managers. Today, the garden's edible landscape has been revived, although many individual trees and tree species have changed due to water shortages and climate change. However, in planning and creating a future vision for the garden, the issue of fruit trees and agricultural economy is now considered by garden managers. From this new perspective, the edible heritage of the historic Persian garden consists of the original species (pomegranate, fig, berry, apricot and pistachio) and additional species (jujube, barberry, and plum). Edible landscape spaces remain edible, but with plant species adapted to new environmental conditions. The dominant idea is still to preserve the cultural heritage and cultural landscape to strengthen tourism. As a result, adorning the garden with a variety of species and seasonal flowers is a priority so that tourists have a pleasant memory of their stay. The MCHTH and Iranian landscape experts, it appears, do not perceive the historic Persian garden as a means of ensuring food security.

Disclosure statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Note

[1]. During the first author's visit to the Fin Garden in 2013, the garden's agricultural landscape had been destroyed and grass was planted instead of fruit trees. But in recent years, the Fin Garden's agricultural landscape revitalization project has been executed, and fruit trees have again been planted in this garden.

Notes on contributors

Mohammad Reza Khalilnezhad holds a PhD degree in Landscape Architecture from the University of Kaiserslautern (TUKL), Germany. He has been a faculty member at the University of Birjand (UoB), Birjand, Iran, for over 10 years. Most of his research in the field of urban agriculture for Iran emphasises the role of Persian gardens. He is one of the first Iranian researchers to deal with urban agriculture and the development of productive urban landscape in Iran from the perspective of landscape planning and landscape architecture and has published several papers in Persian and English in this field.

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Mohammad Ali Jannatifar is the master expert in restoration of the Persian gardens in Iran. He is a senior engineer and supervisor of garden restoration projects in the Ministry of Cultural Heritage, Tourism and Handicrafts of Iran. He is a member of the specialised team for managing and directing the historical gardens of South Khorasan province in eastern Iran.

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